recording/reproducing unit for the sealed space discs is commonly used by all of the sealed space discs. The system also includes a partially partitioned space formed in contact with an outer wall of the sealed casing so that a disc in the sealed space may be loaded or unloaded through this space. By this arrangement, the system can advantageously rely on the storage of discs in open shelf locations without the need for cartridges to contain the discs while still providing an exchange space within the sealed casing that is accessible from outside of the sealed space when discs are required to be exchanged.

The features of the present invention have been discussed with respect to providing optical discs in the sealed space, however, the sealed space can be constructed to contain a plurality of magnetic disc recording media stacked on a common spindle. In this arrangement, the recording/reproducing unit would have heads provided to face each of the recording faces of the individual magnetic disc recording media in order to perform the recording/reproducing function that is required.

In operation, ordinary data read/write operations are performed with the sealed space recording/reproducing unit for the sealed space discs. If data is to be written that exceeds the storage capacity (or recording capacity) of the sealed space disc recording media, the excess data can be written to the cartridge type recording/reproducing unit for storage on a cartridge type disc. As a result, the system is not subjected to a CPU time out when an excessive amount of data is requested to be written to the disc storage system. In this way, therefore, processing can continue without delay.

In the system of the present invention, the control unit controls the recording/reproducing units of both the sealed space and the exchangeable cartridge space. During data writing, therefore, the control unit selects a free disc and more particularly a free area of a disc to write the data. If the sealed space recording media have no free space, this condition is determined and output as a message to the operator of the system that no free disc space is available. For example, this message can be displayed on a display unit, which is part of the data storage/retrieval system. In this case, the operator can then load a cartridge type disc into the cartridge space for access by the cartridge recording/reproducing unit so that any excess data to be written to the storage/retrieval system can be recorded on the cartridge type disc.

During data reading, the control means functions to determine which disc of the sealed disc recording media or the cartridge type discs is stored with the data requested by the host computer. If the data exists in the sealed space disc recording media, then the disc having the data is accessed by the disc access unit and transferred to the sealed space recording/reproducing unit. If the required data is recorded on the cartridge type disc, then the control unit outputs a message for display on the display unit to inform an operator to load a cartridge type disc recording medium into the exchangeable cartridge space. The operator then follows the message that is output and loads the cartridge type recording/reproducing unit with the requested cartridge type discs so that the requested data can be read therefrom.

In the data copying operation, the control unit uses an internal buffer memory to copy data from a cartridge-type disc onto one of the sealed space discs. For example, an operator, after loading one of the cartridge type discs, inputs through an input unit to the control unit a command for performing the copying operation. In this mode, the control unit provides the necessary control information, e.g. the ID of the cartridge type disc recording media, the first address and the data length of the data to be copied. In response to the command issued by the control unit, a free disc is selected among the sealed disc recording media and the cartridge disc data to be copied is read out and stored in a buffer memory in the control unit. Then, the control unit executes the copying operation by writing the data stored in the buffer memory to the selected disc in the sealed disc recording media.

According to a preferred manner of accomplishing the foregoing operations, the control unit manages the sealed space discs and cartridge type discs, as well as the corresponding recording/reproducing units, in accordance with management data that is stored on the disc recording media and in the memory for the control unit. The management data represents the recorded and unrecorded areas of the individual discs in the sealed space and this management data is referred to in data read/write operations. The management data, such as the ID of the individual cartridge type discs accessed through the exchangeable cartridge recording/reproducing unit, the first address and data length in each disc are written in the data writing operations so that the management data is referred to or computed in the subsequent data reading operation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic representation of a disc recording/retrieval system of a first embodiment of the present invention.

FIG. **2** is a schematic drawing of a sealed space access compartment.

FIGS. **3**(*a*) and **3**(*b*) taken together show a flow chart explaining a data write operation using the storage retrieval system of the present invention.

FIG. **4** is a schematic representation of a disc recording/retrieval system of a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The disc storage and retrieval system of a first embodiment of the present invention is shown in FIG. **1**. Disc recording media, such as optical discs **1** are contained within a sealed casing **5** on a plurality of shelves. Each optical disc shelf **4**, shown schematically in FIG. **1**, supports an optical disc **1**. The optical discs **1** are exposed as opposed to being enclosed individually by protective casings or cartridges. Each has a free end facing an interior space of the sealed casing **5** that can be accessed by a disc access unit having a disc carrying device or picker **10** and a mechanism **9** for moving the carrier, shown schematically. Carrier **10** can have one or more fingers, for example, that are adapted to slide under a disc to be retrieved from a shelf **4** and loaded onto a turntable of an optical disc unit **8** for recording/reproducing data, which is also enclosed within the sealed casing **5**. Since the discs **1**, disc access unit and optical disc unit **8** are all enclosed in sealed casing **5**, contamination from dust is reduced to a minimum.

Adjacent the sealed casing **5** is a casing **6**, preferably integrally constructed with sealed casing **5**. Casing **6** houses an optical disc recording/reproducing unit **14**